Health & Safety Manual

Supplement 1.11

Construction Subcontractor Safety Program

Approved by the ES&H Working Group

_____ **date** _____

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Deputy Director of Operations

Contents

* Revised

Construction Subcontractor Safety Program

1.0 Introduction

This supplement describes for Laboratory employees (not for subcontractors) the LLNL Construction Subcontractor Safety Program. Subcontractors shall conduct their activities in accordance with the prescribed standards listed in their subcontract.

2.0 Responsibilities

2.1 Plant Engineering Projects

Plant Engineering manages the construction phases of most Laboratory construction projects. Plant Engineering assigns a construction manager and construction inspector to each project.

2.2 Program Projects

The program management requesting the work manages the construction phases of jobs that do not involve Plant Engineering and assigns a program construction coordinator to each project.

2.3 Procurement Construction Subcontracts Team

The Procurement Construction Subcontracts Team ensures that every construction purchase order or subcontract includes a Subcontractor Safety Plan (see Appendix A for an example) or a Subcontractor Prejob Checklist (form LL 4721; see Appendix B) as part of the bid package.

2.4 Construction Subcontractors

Subcontractors are responsible for the safety of their personnel and for fulfilling other obligations specified by their subcontract.

2.5 Hazards Control Department

Hazards Control reviews the subcontractor's safety-related submittals and audits the subcontractor's safety performance. These functions are performed primarily by industrial safety engineers and technicians who advise Plant Engineering of their findings.

Construction Safety Manager. The construction safety manager administers, plans, and coordinates the LLNL Construction Subcontractor Safety Program. In carrying out this function, the construction safety manager

- Provides interpretation of all applicable health and safety codes in a manner consistent with Laboratory policy.
- Audits and documents Subcontractor Safety Plans.
- Periodically audits and documents field operations for technical adequacy and compliance with prescribed codes and regulations.
- Serves as technical advisor to Laboratory management and Plant Engineering Construction Division personnel and assists them in developing solutions to identified safety problems.
- Develops, coordinates, and presents safety talks and training sessions to Laboratory employees.
- Assists Plant Engineering during investigations of accidents and incidents and coordinates collection of certain required data for recordkeeping. Alerts management to significant accidents or incidents and emerging trends in accident experience.
- Provides management with an annual summary and analysis of construction-related accidents and incidents.
- Directly supervises the activities of the construction safety coordinator.

Construction Safety Coordinator. The construction safety coordinator monitors construction subcontractor safety programs for accident prevention and compliance with the provisions of LLNL's Construction Subcontractor Safety Program. Specific duties of the construction safety coordinator are to

- Perform and document safety inspections and analyses of buildings and facilities under construction, including equipment and apparatus.
- Review project documents (e.g., procedures, specifications, drawings, and plans) to evaluate anticipated construction methods for compliance with applicable safety standards.
- Provide technical guidance to the Plant Engineering Construction Division and assist them in developing solutions to industrial safety problems and to refer other safety issues to the proper safety discipline.
- Develop, evaluate, revise, and present safety talks and training sessions to Laboratory employees.
- Analyze accidents and incidents for causes and prepare necessary documentation.

Industrial Safety Engineers. Program construction projects are audited and documented by the industrial safety engineer assigned to the Safety Team for that program.

3.0 Stop-Work Procedures

The stop-work procedure at the Laboratory (see Section 1.06 of this manual) applies to all construction activities. The stop-work procedure will normally be used only where imminent-danger situations exist. When a stop-work order is issued, only those areas of the construction project immediately involved in the hazardous situation are to be included in the order.

A stop-work order is normally issued by the construction manager, the program construction coordinator, or the construction inspector. If they are absent and the subcontractor personnel are involved in an imminent-danger situation, Hazards Control personnel shall stop the operation and immediately locate the construction inspector, construction manager, program construction coordinator, or construction management organization leader. This is the only time that Hazards Control personnel are authorized to directly contact subcontractor personnel.

A stop-work order may be issued by the construction manager for a portion of the work area or the entire work area when, in his/her opinion, the work area(s) is not being maintained according to the Subcontractor Safety Plan requirements. The stop-work condition will be in effect until the subcontractor resolves the problems and brings the work area(s) to complete conformance with safety requirements. Such stop-work orders normally will not be issued unless the subcontractor shows a consistent disregard for construction safety or ignores/refuses to correct deficiencies when they are discovered by LLNL personnel.

Differences of opinion between the Hazards Control representative, construction manager, program construction coordinator, and construction inspector concerning a stop-work order shall immediately be referred to their respective supervisors or division leaders for resolution. An Incident Analysis Report (form LL 2574) may be required after each instance in which work has been stopped (see Supplement 4.08 of this manual).

4.0 Accidents

4.1 Immediate Notification

The construction manager, program construction coordinator, or construction inspector are immediately notified by the subcontractor when a serious incident occurs. A serious incident is an incident that involves the following:

- A fatality or possible fatality.

- An injury or illness that may produce permanent or prolonged disablement.
- Injury or illness to several employees in the same incident.
- Anything that could cause concern to LLNL employees or the public or that could have a significant effect on the off-site environment.

The construction manager, program construction coordinator, or construction inspector shall ensure that the subcontractor ceases all work at the site of the incident until the construction manager or program construction coordinator and the Hazards Control Safety Team Leader for the area jointly provide additional instructions.

The site of an accident involving serious injury or fatality shall be isolated and access to it controlled until the area is released by Hazards Control. The area shall remain intact until a safety evaluation has been completed.

Additional notification requirements are described in Chapter 4 of this manual.

4.2 Incident Analysis

The department administering the subcontract and Hazards Control shall jointly determine the extent of the incident and the mechanism for handling any required incident analysis, using the principles described in Chapter 4 of this manual.

5.0 Safety Plans

Every construction subcontract requires that the subcontractor submit a Subcontractor Prejob Checklist or a written Subcontractor Safety Plan. A written safety plan is required for major projects. Major projects include, but are not limited to the following:

- Projects that cost over $750,000.
- Projects with severe hazards (i.e., deep trenching, steel erection, or wood construction above 70 ft).
- Projects that involve demolition of major structures.
- Projects that are DOE prime contracts.

Each written Subcontractor Safety Plan shall reflect the type of construction safety required. Each subcontractor shall prepare the safety plan to conform with OSHA requirements and good safety practices (Appendix A provides a sample format that may be adapted for use by the subcontractor when fulfilling this requirement).

Other projects may satisfy this requirement by submitting a Subcontractor Prejob Checklist (form LL 4721; see Appendix B). Submission of the safety plan or checklist shall be accepted by Hazards Control and by either the construction manager or program construction coordinator and documented *before* work begins.

6.0 Radiation Safety

When a subcontractor brings a radioactive source on site or subcontractor employees work in areas where access is controlled for radiation safety purposes, before start of the job the construction manager or program construction coordinator must notify the construction safety manager who will alert the Health Physics Group.

When radiation dosimeters are issued to subcontractor personnel, they shall be exchanged at least on a quarterly basis (monthly, if required) and turned in at the completion of the job assignment.

When subcontractor personnel are asked to work in areas where access is controlled for radiation safety purposes, the Health Physics Group will provide a briefing regarding radiation safety requirements.

Appendix A

Example of Subcontractor Safety Plan

Safety, Accident Prevention, and
Fire Protection Plan for
Construction of

(Project name)

for the
University of California,
Lawrence Livermore National Laboratory

SUBCONTRACT NO. _____

_____

(Insert Title of Subcontractor)

_____

_____

_____

_____

(Name and Address of Subcontractor)

_____

(Signature of Subcontractor)

_____

(Date)

FOR LLNL USE ONLY

Hazards Control Review of Checklist **Satisfactory** ☐ **Unsatisfactory** ☐

By: _____ **Date:** _____

Approval

Buyer: _____ **Inspector:** _____ **Construction Mgr:** _____

Contents

Safety, Accident Prevention, and Fire Prevention Plan

Policy Statement

The policy is to provide a safe and healthful working environment for all personnel through proper inspection, guidance, and adherence to safety codes and standards. All work shall be done in a safe manner. Safety is a management responsibility. To prevent injuries, illnesses, accidental fires, and property damage, all supervisory personnel shall demonstrate the ability to recognize hazards and take necessary steps to eliminate existing and potential hazards. All supervisors and employees shall perform their duties in compliance with the required safety codes and standards.

Purpose

This Safety, Accident Prevention, and Fire Prevention Plan has been compiled to make all personnel working on the project thoroughly aware of the need to eliminate all possible causes of accidents.

Safety Responsibilities

Safety is the responsibility of management. (Name) _____, (Title) _____, shall be the designated on-site safety representative for (company or firm name) _____ _____. He/she shall be responsible for administering the safety program of this (project name) _____project and shall also be responsible for the inspections, training, and reporting needed to carry out this subcontract.

Construction superintendents are responsible for continuously checking for and eliminating all possible hazardous conditions. They are responsible for conducting safety meetings and for the constant training of personnel. All personnel shall be trained to become aware of unsafe conditions and correct them. Any unsafe condition must be immediately corrected and reported to management. All required safety equipment, if not provided by individual employees, shall be supplied by the subcontractor.

Superintendents shall make weekly safety inspections of the entire job, and a record of this inspection shall be made available at the job site. Superintendents are responsible to initiate immediate corrective action for any deficiencies noted

during these inspections and for unsafe conditions and practices brought to his/her attention. Superintendents shall encourage employees to inform the employer of hazards at the worksite without fear of reprisal. Superintendents shall immediately stop any activities considered to be "imminently hazardous." Safety statistics shall be reported as required by the Department of Labor, Department of Energy (DOE), and Lawrence Livermore National Laboratory (LLNL) of the University of California.

Each employee shall be held responsible for performing his/her work in a safe manner in accordance with this safety plan. Any employee who, in the judgement of management, knowingly commits an unsafe act or creates an unsafe condition, disregards this safety policy, or is a repeated safety or health offender, will be subject to disciplinary actions up to and including discharge. All employees shall be ready at all times, without fear of reprisal, to correct unsafe conditions or to report hazards at the worksite to their supervisors or management directly or via the anonymous hazard reporting system.

Accident Reporting

All individuals who are injured shall report the accident, however minor, to their immediate supervisor. All incidents and accidents shall be reported to the construction manager, construction inspector, or Program construction coordinator within 2 working days. When a serious accident occurs, subcontractor management and the LLNL construction manager or Program construction coordinator shall be notified immediately. Supervisors shall obtain all pertinent information so that proper forms can be completed in the required number and forwarded to the construction inspector or LLNL representative within 5 working days. Supervisors shall keep an injury log at the job site. Foremen and supervisors shall be responsible for making proper reports to the subcontractor's company office.

Employee Training

Bulletin Board

A bulletin board shall be prominently placed next to the subcontractor's site office or as otherwise directed by the construction manager or Program construction coordinator. This board shall post the following bulletins:

- Emergency phone numbers: Livermore—dial 911 on site and 447-6880 from outside the Laboratory; Site 300—dial 911.
- Dates and times that supervisors' safety meetings will be held (minimum of one per week).
- Dates, times, and places of tool box meetings, and requirements for attendance (minimum of one per week).

- The required DOE announcements and bulletins.
- Miscellaneous safety posters (DOE, LLNL, etc.).
- Locations of on-site Material Safety Data Sheets (MSDSs).

Safety Meetings

Safety meetings shall be held weekly for all employees. The purpose of these meetings is to educate and train employees and develop the proper safety attitude in the performance of their jobs. Proper handling of hazardous materials shall be covered prior to their use on the job site. Attendance records shall be maintained at the job site.

First-Aid Stations

All personnel shall also be instructed in emergency procedures, first aid, and the location of the LLNL first-aid station.

Medical Supplies and Assistance

First Aid

First-aid kits shall be placed in the field office and carried in the Superintendent's vehicle. First-aid equipment shall be inspected regularly for completeness, and an employee qualified in first aid shall be on site during the normal work shift.

Emergency Phone Numbers

The emergency phone number card, in addition to being posted on the project bulletin board, shall be posted prominently in work areas and carried in each superintendent's vehicle. Depending on the nature of the accident and the first aid or medical care required, the necessary assistance shall be requested by phoning the emergency number indicated on the card.

Personal Protective Equipment

It is the responsibility of supervisors and foremen to provide all employees with directions about employer-provided and employee-provided protective equipment necessary for each operation. Personal protective equipment shall be worn as required by appropriate codes and standards.

- Hard hats shall be worn at all times in construction areas, except in administrative areas.
- Eye protection shall be used by all employees while performing any operation in which a hazard to the eyes exists. Examples of such operations are welding, cutting, burning, sandblasting, grinding, sawing, hammering, and the use of impact tools.

- Respiratory protective equipment shall be used when the nature of the work requires it.
- Welding shields or goggles shall be worn by personnel doing cutting or welding.
- Strong nonslip gloves are recommended for all workers, except when wearing them could create greater risks.
- Sturdy work shoes or boots are required in construction areas. Safety shoes or boots are recommended for all workers.

Hazardous Materials Control

Health Hazard Communication Plan

A written plan for compliance with state and federal worker right-to-know laws is a requirement. This plan shall include specific safety responsibilities for all levels of management and for the employee.

Identification

Chemicals, paints, solvents, adhesives, etc. may be used in the course of construction. An inventory of all potentially hazardous materials shall be available on site in the construction office, along with a MSDS for each material. These shall be available at all times to employees, LLNL inspectors, and other persons affected by the materials (e.g., other subcontractors on the same job site).

All containers shall be labeled describing the product's identity, its hazards, and first-aid procedures to follow in the event of an emergency.

Worker Notification

Before using any hazardous material, each worker shall be aware of the requirements of this section and be trained in the proper use, disposal, and special handling procedures to be followed for each material (e.g., when respirators are to be worn).

Handling

While handling hazardous chemicals or solvents, employees shall follow directions and comply with any warnings or cautions affixed to the labels. Any questions concerning the use of such chemicals and personal protective equipment shall be directed to the supervisor.

Disposal

The subcontractor is responsible for proper disposal of chemical and hazardous waste generated by the subcontractor in the performance of this subcontract. Preexisting hazardous material removed and discarded as waste

by the subcontractor in the performance of this subcontract shall be disposed of by LLNL.

Traffic Control

Traffic control and routes are as indicated on the construction drawings and outlined in the written instructions. Sketches for the construction of certain detours in areas not indicated on the drawings shall be submitted to the LLNL construction manager or Program construction coordinator for approval. Personnel are directed to become familiar with these details.

Required safety, fire, instructional, and traffic signs shall be posted and obeyed. They shall not be removed until their removal is approved by the construction manager or Program construction coordinator.

All flagmen shall wear blaze orange vests.

Fire Prevention

Hot Work Operations

A Hazardous Work Permit is required for all hot work operations. Hot work operations include cutting, welding, brazing, soldering, roofing or road work using tar pots, torches and hot air guns used in applying roofing, thermal spraying, or any similar activity. The requirements of the Permit shall be followed without exception. The construction inspector or program construction coordinator must be notified to contact the LLNL Fire Safety Division to arrange for the permit.

Smoking

Smoking is prohibited at or in the vicinity of hazardous operations or combustible or flammable materials. “No Smoking” signs shall be posted in these areas. Smoking will be allowed only in designated areas. Where smoking is permitted, safe receptacles shall be provided for smoking materials.

Waste Disposal

Accumulations of combustible waste material, dust, and debris shall be removed from the structure and its immediate vicinity at the end of each work shift, or more frequently as necessary for safe operations. Good housekeeping shall be maintained, and access will be kept clear at all times. If portable dumpsters are provided for waste disposal, they shall be located at least 25 ft from any structure.

Fire Alarm Reporting

A public fire alarm box and telephone service to a responding fire department or equivalent facilities shall be readily available near the premises. Instructions shall be issued to notify the fire department immediately in case of fire. The local fire department number shall be conspicuously posted near each telephone.

Access for Firefighting

Access routes for firefighting equipment shall be maintained. Fire hydrants and fire department connections shall be kept clear of any obstructions.

Fire Extinguishers

Fire extinguishers shall be located on or adjacent to:

- Storage sites of combustibles.
- Fuel dispensing vehicles.
- Sites of hot work operations.
- The supervisor's vehicle.
- The supervisor's office or shed.

In addition, at least one approved extinguisher shall be provided in plain sight on each floor at each usable stairway where combustible material could accumulate. Extinguishers shall be placed within the structure so that the maximum travel distance to an extinguisher is no more than 75 ft.

Solvents

Flammable or combustible solvents shall not be used for cleaning purposes without specific instructions from the supervisor and such instructions shall include the site and conditions of such use.

Sanitation and Industrial Hygiene

Sanitation and Industrial Hygiene shall comply with the following listed standards:

- Toilet facilities shall be provided at the work site.
- Bottled drinking water and disposable cups shall be provided, along with a container for the disposal of used cups. This drinking water shall be conveniently placed in the area of the work site.
- Proper ventilation shall be maintained in order to avoid possible harmful buildup in areas where toxic fumes, dust, vapors, or gases may be produced. Respiratory protection shall be supplied when adequate ventilation cannot be provided.

General and Special Instructions

General Instructions

All employees shall comply with the following general instructions:

- All employees shall comply with this plan, assist all other employees in doing so, and report all dangerous conditions or practices immediately to their supervisors.
- When injuries occur, the first step is always to provide medical care for the injured and eliminate immediately any apparent cause of the injury. If a cause is not apparent, the work area and equipment shall be secured until the cause is determined by qualified authorities.
- No one shall be permitted to work while his/her ability or alertness is impaired by illness, fatigue, medication, or other causes.
- Reporting to work under the influence of alcohol, stimulants, tranquilizers, or barbiturates—or using them during working hours—will be cause for permanent removal from the LLNL work site and grounds for disciplinary or legal action if warranted.
- No guard, safety device, or appliance shall be removed from tools, machinery, or equipment except for the purpose of making repairs. Such removal shall only be done by persons qualified to make the repair, and they shall first disconnect any power source and have the tool, machinery, or equipment in a safe area.
- Employees shall not handle electrical equipment, machinery, vehicles, or air and water lines in a manner outside of the scope of their regular duty except with specific instructions from their supervisors.
- Employees shall not enter trenches, ditches, or any other subsurface area without specific instructions from their supervisors.
- If employees observe sandblasting dust, asbestos fibers, smoke, or other possibly dangerous pollutants in the air of a work space, they shall contact their supervisors for instructions.

Work in Confined Spaces

Employees shall not enter or work in confined spaces (such as tanks, vaults, holds, or manholes) without specific instructions from their supervisors. All confined-space entries shall be made in accordance with the provisions of Supplement 26.14 of LLNL *Health & Safety Manual* (available through the construction manager or Program construction coordinator). The subcontractor shall arrange confined space entries through the construction inspector or program construction coordinator.

Explosives Safety

When a construction subcontractor will be using explosives during construction or demolition operations, an Operational Safety Procedure is required. The construction manager or Program construction coordinator shall be notified before any explosives are brought on site. All work performed with explosives shall be in accordance with Chapter 24 of LLNL *Health & Safety Manual* (available through the construction manager or Program construction coordinator), and in accordance with OSHA 29 CFR 1926 and 29 CFR 1910 requirements.

Ladders and Stairways

- Employees required to use ladders and stairways shall be trained in their safe use and in the recognition of hazards related to them.
- No employee shall use a ladder that is defective or does not meet OSHA requirements.
- Wooden ladders shall not be painted. They may be treated with linseed oil.
- Splicing of ladders is prohibited.
- Work shall be arranged so that employees are able to face ladders and use both hands while climbing.
- The use of ladders to transport heavy or awkward-shaped items is prohibited.
- Step ladders shall never be used as straight ladders. They shall be fully opened at all times except when in storage. Employees shall not be allowed to stand on the top step or end cap of step ladders.
- Stairways shall meet OSHA requirements.

Scaffolding

- All scaffolding shall conform to 29 CFR 1926.451 (Federal OSHA Construction Safety Standards).
- All job site supervisors and foremen shall be advised of their responsibility for the safety of their personnel when assigning personnel to work on or off scaffolding.
- It is imperative that the designated subcontractor safety representative make daily safety inspections of all scaffolding before use. Written records of such inspections shall be maintained.
- If several crafts are using sections of the scaffolding simultaneously, it may be necessary to inspect the scaffolding more frequently, especially if other crafts are removing brackets, bracing, tie-wires, planking, or other objects to get their equipment or materials into place.

- Scaffolding inspection shall include, but not be limited to base plates, sills, bracing, tie-ins, planking, access ladders to working levels, guardrails (handrail, midrail, and toeboard), anchorage to building structure, and plumb scaffold.

Machinery and Vehicles

- Unless it is part of their regular duties, for which they have had adequate training, no employees shall operate machinery or equipment without specific instructions and guidance. Only licensed operators shall operate vehicles.
- Operators shall inspect vehicles and equipment daily before beginning work and at the end of the shift, reporting any obvious areas of possible malfunction (such as brakes or tires). Repairs shall be made promptly. Defective vehicles and equipment shall not be used until repairs are made.
- Floors and decks of equipment shall be kept clean and free of anything that might cause slipping, tripping, or a falling hazard.
- The need for servicing or repairs shall be reported to the supervisor. No repairs or adjustments shall be made on units during operation. No lubrication shall be performed on units during operation except those on which the manufacturer has installed safeguards specifically for the protection of the person doing the lubrication.
- Audible alarms shall be installed and maintained on all heavy equipment, as specified in 29 CFR 1926.602. Job superintendents shall make daily safety inspections. Operators are responsible for immediately reporting to supervisors any apparent or latent unsafe conditions of the equipment being operated. Job site records shall be maintained, as required under 29 CFR 1926, Federal OSHA Construction Safety Standards.
- Working under suspended loads is forbidden.
- Employees are prohibited from riding booms, loads, slings, hooks, or lift-truck forks or platforms.
- Air hoses shall not be disconnected until they are bled and pressure is securely turned off at its source. All air hoses shall meet the requirements of 29 CFR 1926.302(b) (Federal OSHA Construction Safety Standards).
- Employees shall inspect all backfill areas before starting backfill operations.
- Adequate devices shall be worn for protection of hearing by operators or employees working near units producing noise levels in excess of prescribed standards.

- No vehicle shall be operated in a reckless or careless manner or at a speed that is not reasonable and proper with regard to weather, traffic, surface condition, visibility condition, load, or type of vehicle.
- All vehicular accidents that occur on the Laboratory site, of whatever size and nature, whether injury or noninjury, shall be reported immediately to the superintendent and to the LLNL construction manager or Program construction coordinator.
- Caution shall be taken to make sure that no one is below when equipment is used near tops of cuts, banks, or inclines.
- Special care, and an observer(s) with whom effective communication has been set up, shall be used where there is a possibility of overturning equipment (e.g., near tops of cuts, banks, inclines, deep fills, and soft or muddy terrain).
- Employees who are riding on flatbed trucks shall ride sitting with their backs to the cab. Employees riding in the back of pickups shall ride sitting on the bed of the pickup (see California Vehicle Code).

Welding and Cutting—General

- Only trained employees, whose regular duties as assigned by their supervisors include welding and cutting, shall perform this work.
- Only standard, approved equipment shall be used.
- Fire extinguishers will be easily accessible to all employees performing welding or cutting operations.
- Screens or shields shall be provided for the protection of persons or combustible material exposed to sparks or falling objects; a fire-watch shall be posted where necessary, with an adequate extinguisher and signaling device.
- When working on lead, zinc, or other materials that could generate harmful fumes, adequate ventilation and exhaust devices shall be provided. When ventilation is not practical or feasible, respiratory protection shall be used.
- The designated safety representative or foreman shall inspect the work site before any use of welding or cutting equipment to ensure that all combustibles in the work area have been removed or otherwise protected from the welding or cutting work. He/she shall also assure that a current Hazardous Work Permit for hot work is in effect at the designated job site.

Arc Welding

- Frames of welding machines operated from electric power sources shall be properly grounded.

- When welding, employees shall wear adequate masks or hoods with proper eye protection, gloves, and leather aprons as minimum protection; these shall be supplemented with hard hats, safety shoes, and other protective gear where warranted.
- All employees and passersby near the welding area shall be protected from eye flash-burns by use of partitions, screens, or other appropriate methods.
- Welding cables, cords, and leads shall be neatly secured so as not to cause tripping.
- Electrode stubs shall be disposed of immediately in a safe container.

Oxygen/Acetylene Welding and Cutting

- Cylinders shall never be dropped or struck.
- Cylinders shall be stored away from any source of heat.
- Where stored in the open, cylinders shall be protected from continuous sunlight.
- Oxygen cylinders shall be stored at least 20 ft away from those containing any fuel gas.
- Where stored inside, oxygen cylinders shall be separated from those containing fuel gases by a 5-ft-high, noncombustible barrier with a fire rating of a least 1/2 hr, or they shall be separated by a 20-ft distance.
- Cylinders shall be stored vertically and chained to prevent them from falling over.
- Cylinders shall never be lifted by machinery unless they are in a safe stand or cradle or are otherwise positively secured against falling or being dropped.
- Special arrangements shall be made to secure cylinders while they are being transported. Carrying them loose on the back of a truck or in a pickup is prohibited.
- Caps shall be firmly screwed onto cylinders except when the cylinders are connected to a regulator during use.
- Oxygen cylinders shall be kept free from oil or grease. Use of oil or grease as a lubricant for oxygen valves or attachments is prohibited.
- Smoking or flame is prohibited near welding gas cylinders or outlets.
- Field adjustment or repair of gauges, valves, accessories, or safety devices is prohibited.
- Acetylene shall not be used for welding or cutting at pressures exceeding 15 psig.

- Acetylene cylinder valves shall not be opened more than one full turn, and the wrench shall be left on the valve stem so that the valve can be closed quickly if necessary.
- Oxygen cylinder valves shall be opened fully and made hand-tight against the back seat. This takes the high-range cylinder pressure off the packing.
- Mixing gases in cylinders, refilling cylinders, or using cylinders for any use except their original purpose is prohibited.
- It is permissible to close torch valves alone only when work is briefly suspended and the operator is nearby. Any other interruption of use (e.g., if one cylinder becomes empty) necessitates closing the cylinder valves, followed promptly by opening the torch valves to purge lead-hoses and releasing the regulator screws.
- Hoses shall never be hung from regulators, other equipment, or the cylinder tops.
- Reverse-flow check valves or flashback arrestors shall be provided on oxygen and acetylene systems.

Excavation, Trenching, and Shoring

All excavation, trenching, shoring, and backfilling shall be in accordance with 29 CFR 1926, specifically Subpart P, copies of which shall be available at the construction site. Superintendents and foremen shall be familiar with these regulations and direct workers accordingly. Before beginning any excavation or trench that is 5 ft deep or more, the subcontractor shall submit a written plan to the construction manager or Program construction coordinator.

Fall Protection

All floor or wall openings and platforms that expose workers to a fall of more than 6 ft shall be covered or protected by guardrails.

Fall-protection equipment (e.g., full body harnesses, lanyards, and lifelines) approved under 29 CFR 1926.104, Subpart M, and 29 CFR 1910 shall be made available to and worn by all workers exposed to an unprotected fall of more than 6 ft.

Structural Steel

All structural steel erection shall be performed in accordance with 29 CFR 1926, Subpart R. “Christmas-treeing” of structural steel shall not be allowed.

Working with Asbestos

All asbestos-related work shall be performed only by employees who have received mandatory training. All work with asbestos shall be conducted in accordance with the provisions of 29 CFR 1926.1101, the asbestos safety criteria

subcontract specifications, and Supplement 21.19 of LLNL *Health & Safety Manual* (available through the construction manager or Program construction coordinator).

Radiation Safety

All use of radioactive materials, ionizing radiation sources, or radiographic equipment shall comply with 29 CFR 1910.1096 and 10 CFR 835. The construction manager or Program construction coordinator shall be notified before the start of work with radioactive materials, ionizing radiation sources, or radiographic equipment, or when work will occur in areas where access is controlled for radiation safety purposes.

Hand Tools

All hand tools, whether self-owned or company-furnished, shall be maintained in safe condition. Unsafe tools shall not be used until repaired.

Guards required on power tools shall be used at all times. Switch-locking devices shall comply with the requirements of 29 CFR 1926.300. Power grinders shall have protective shields.

All gasoline- or diesel-powered tools and equipment shall be stopped during refueling.

Studguns, powder-actuated, and powder-assisted industrial tools must be designed and equipped to prevent free flight of any projectile. Operators shall be trained in the operation of the particular tool in use and carry a valid operator's card for the specific tool. Records of training and certification will be maintained by the subcontractor.

Electrical

The electrical safety requirements contained in 29 CFR 1926, Subparts K and V, shall be followed for the practical safeguarding of employees involved in construction work. In addition, all construction operation electrical wiring and equipment for light, heat, or power purposes shall be in accordance with pertinent provisions of NFPA 70, "National Electrical Code," and ANSI C2, "National Electrical Safety Code."

Temporary lights shall be equipped with guards to prevent accidental contact with the bulb. Guards shall not be required when the reflectors are constructed with bulbs that are deeply recessed. Temporary lights shall be equipped with heavy-duty electrical cords, with connections and insulation maintained in safe condition. Temporary lights shall not be suspended by their electric cords unless the cords and lights are designed for such suspension.

Electric tools shall be grounded using three-prong plugs and receptacles (except for double-insulated tools). All 15- to 20-ampere receptacle outlets on single-phase circuits for the construction site shall be protected by ground-fault circuit interrupters.

All electrical-power extension cords shall be used and maintained as specified in 29 CFR 1926.405 and 416. Splices shall have insulation equal to that of the cable.

Nonelectrical Work Performed Near Exposed High-Voltage Power Distribution Equipment

All nonelectrical work performed near exposed high-voltage (i.e., 600 volts or greater) power distribution equipment, including electrical lines, substations, switchyards, manholes/vaults, and other similar installations shall be in accordance with LLNL's guidelines (available through the construction manager or Program construction coordinator). Included in the guidelines are activities such as wire pulling and splicing, excavating and trenching, boom/crane/manlift operations, fencing, lighting, drilling, and other construction work.

Lockout and Tagout

All lockout and tagout operations shall conform to Supplement 26.13 of LLNL H*ealth & Safety Manual* (available through the construction manager or Program construction coordinator). Supplement 26.13 applies to lockout and tagout procedures for the servicing and maintenance of machines and equipment in which the unexpected energizing or start-up of the machines or equipment or the release of stored energy could cause injury or death to personnel. An energy source includes any source of electrical, mechanical, hydraulic, chemical, thermal, ionizing and nonionizing radiation, or other energy.

Prescribed Codes, Standards, and Regulations

All work performed shall be in accordance with the requirements of the latest edition of the following codes and standards, which shall be considered minimum requirements:

- 29 CFR 1926, "Safety and Health Regulations for Construction," Department of Labor (OSHA).
- 29 CFR 1910, "Occupational Safety and Health Administration," Department of Labor.
- 10 CFR 835, "Occupational Radiation Protection."
- American National Standards for Safety (ANSI), as applicable.

- National Electrical Manufacturer's Association (NEMA), as applicable.
- National Fire Codes (NFPA).
- National Electrical Code (NEC-NFPA).
- National Plumbing Code (International Association of Plumbing and Mechanical Officials).
- Uniform Plumbing Code (International Association of Plumbing and Mechanical Officials).
- ASME Boiler and Pressure Vessel Code, Sections I–IX.
- 49 CFR 192, "Pipeline Safety Standards."
- Any amendment or other safety codes applicable to the task being performed.
- DOE Explosives Safety Manual (DOE M 440.1-1).

Appendix B

Subcontractor Prejob Checklist

This checklist consists of Occupational Health and Safety items that are most often overlooked by primary contractors and their lower-level subcontractors when performing work at LLNL. These items and all other Occupational Health and Safety Requirements in the contractual documents will be enforced.

I. Mandatory Requirements, All Projects, General

1. The subcontractor shall have the Code of Federal Regulations (29 CFR 1926, OSHA) on job site. (Construction Safety Regulations Part 1926 are available from the U.S. Government Printing Office Bookstore, 450 Golden Gate Ave., San Francisco, CA 94102 [415-566-6657]).
2. The subcontractor shall display all required DOE notices furnished by LLNL.
3. The subcontractor shall provide for regular and frequent inspections of job sites, materials, and equipment to be made by competent persons (29 CFR 1926.20).
   a. The subcontractor is responsible for initiating immediate corrective action for any deficiencies noted during these inspections and for unsafe conditions and practices brought to his/her attention.
   b. The subcontractor shall immediately stop any activities considered to be imminently dangerous.
4. The subcontractor shall immediately notify the LLNL Construction Manager or Program Construction Coordinator in the event of a serious incident or accident. All incidents and accidents shall be reported to the Construction Manager, Construction Inspector, or Program Construction Coordinator within 2 working days. The subcontractor shall comply with injury/illness reporting requirements by submitting a completed copy of Workman's Compensation Report or Contractor First Report of Injury form to Construction Inspector within 5 working days of injury.
5. The subcontractor shall provide Laboratory's medical emergency telephone number—Livermore, 447-6880, or on-site, dial 911; Site 300, dial 911—in a conspicuous location at the job site.
6. The subcontractor shall provide for orientation and training of employees in accordance with 29 CFR 1926.21.
7. The subcontractor shall provide first-aid supplies and qualified personnel to administer first aid at the job site in accordance with 29 CFR 1926.50.

8. The subcontractor shall comply with housekeeping requirements (29 CFR 1926.25).
9. The subcontractor shall comply with all sign and tag requirements (29 CFR 1926.200).
10. All construction projects at LLNL are "Hard Hat Construction Sites," and hard hat signs shall be posted.
11. Construction areas, ramps, runways, corridors, offices, shops, and storage areas shall be lighted while any work is in progress (29 CFR 1926.56).
12 The subcontractor shall ensure that workers on construction projects wear substantial footwear (29 CFR 1926.28).
13. The subcontractor shall obtain—through the construction inspector or program construction coordinator—an LLNL Hazardous Work permit for welding or burning operations before start of project.
14. The subcontractor shall provide and require the wearing of appropriate personal protective equipment in all operations where workers are exposed to hazardous conditions or where it is needed to reduce the hazard exposure to workers.
15. The subcontractor shall comply with LLNL guidelines for nonelectrical work performed near exposed high-voltage power distribution equipment, including electrical lines, substations, switch yards, manholes/vaults, and other similar installations.
16. All lockout and tagout operations for electrical or other energy sources shall conform to Supplement 26.13 of LLNL's *Health & Safety Manual*.

II. Industrial Safety

A. Hand and Power Tools

1. The subcontractor shall inspect all tools and repair or replace tools with burrs, mushroom heads, and broken or damaged handles, and grips on files and rests, etc., in accordance with 29 CFR 1926.301.
2. Will the work performed on this project involve the use of electrically powered tools? If YES, the following requirements apply:
    a. Install ground-fault circuit interrupters on all electrical power sources in accordance with the latest edition of the National Electrical Code.
    b. Ground all extension cords, outlets, and electrical tools in accordance with 29 CFR 1926.404.
    c. Inspect, test, repair, or replace any damaged extension cords, connectors, or receptacles (29 CFR 1926.416).

3. Equip all power tools with guards in accordance with 29 CFR 1926.300 through 29 CFR 1926.304.
4. Will the work performed on this project involve the use of powder-actuated tools? If YES, these tools shall be operated in accordance with 29 CFR 1926.302(e). Eye protection shall be worn. Operators shall be trained in the operation of the specific tool and carry a valid operator's card.

B. Ladders and Stairways

1. Will the subcontractor use ladders and/or stairways on this project? If YES, requirements a–f apply.
   a. Use and store ladders in accordance with 29 CFR 1926, Subpart X.
   b. Ladders to be used for electrical work shall be nonconductive in accordance with 29 CFR 1926.1053(b)(12).
   c. Submit a list of the kind and height of ladders to be used on the job site (e.g., extension ladders, job-made ladders).
   d. Repair defective ladders immediately or remove them from the LLNL site or construction site.
   e. Stairways shall be erected and used in accordance with 29 CFR 1926, Subpart X.
   f. Employees shall be trained to safely use ladders and stairways and to recognize their related hazards.

C. Scaffolds

1. Will the subcontractor use scaffolds on this project? If YES, requirements a–d apply.
   a. The construction and erection of scaffolding shall be in accordance with 29 CFR 1926.451.
   b. A list of the kinds of scaffolding and working heights—e.g., wood, tubular, rolling, suspended, spiders, sky climbers, and aerial lifts—shall be submitted.
   c. Scaffolds shall be equipped with guard rails consisting of a toprail, midrail, and toe board.
   d. Scaffolds shall be secured to the structure every 26 ft in height and 30 ft in length.

D. Roofing/Roof Work

1. Will the subcontractor be engaged in roofing or roof top work? If YES, requirements a–f apply.

a. Roofing and roof top work shall be performed in accordance with 29 CFR 1926.500(9).

b. Employees engaged in roof top work shall be protected from falling from unprotected sides and roof edges by one or a combination of the following:

- A motion-stopping safety (MSS) system.
- Warning lines erected no less than 6 ft from roof edge.
- A safety monitoring system.

c. Employees involved in handling materials at an unprotected roof edge shall be protected from falling by an MSS system.

d. Guard rails shall be erected a minimum of 4 ft on each side of the access point through which materials are hoisted.

e. Materials shall be stored a minimum of 6 ft from roof edge.

f. Ladders used to access roof tops shall conform to 29 CFR 1926.450.

2. Will the work performed on this project involve the use of hot asphalt or pitch on the roof? If YES, requirements a–d apply.

a. Buckets containing hot asphalt or pitch shall not be carried on ladders.

b. Areas under hot materials lifting zones shall be barricaded off to keep personnel out of the area.

c. A clear path of travel shall be maintained along all paths of hot carry.

d. A class BC extinguisher shall be kept near each kettle or tanker in use.

E. Hoists, Cranes, Elevators, Manlifts, Cherry-Pickers, Backhoes, and Loaders

1. The subcontractor shall inspect and maintain inspection records of all equipment in accordance with 29 CFR 1926.550 and 29 CFR 1926.552–556.
2. All crane work in proximity to electrical distribution and transmission lines shall be protected as outlined in 29 CFR 1926.550(a)(15).

G. Excavation, Trenching, and Shoring

1. Will the subcontractor be doing any excavation, trenching, or shoring on the project? If YES, 29 CFR 1926.650 through 29 CFR 1926.652 and requirements a–e apply.

a. Prior to excavation, attempts must be made to locate underground utilities.

b. Detailed specifications must be submitted to LLNL on all jobs requiring shoring before starting any excavation.

c. Lighted barricades must be used on all roadways.

d. Barricading trenches at LLNL will conform to LLNL standards.

e. All personnel bridges over trenching or excavation must be equipped with safety railing.

H. Steel Erection and Assembly

1. All work shall be in accordance with 29 CFR 1926.750 through 29 CFR 1926.752. Working on or off elevated surfaces shall be in accordance with 29 CFR 1926.104 and 29 CFR 1926.105.
2. Before beginning work, a Fall Protection Plan shall be submitted, indicating the kind of work, heights involved, and fall protection equipment to be used, including protection of personnel working below (e.g., safety nets and debris nets).
3. "Christmas treeing" of structural steel will not be allowed.

I. Personal Protective Equipment

1. Will the work performed on this project involve hazards that require the use of any of the protective equipment listed below? If YES, check ([[radical]]) the following equipment that will be used on this job. Equipment shall be used in accordance with the referenced 29 CFR section.
   - GOGGLES, 29 CFR 1926.102
   - FACE SHIELDS 29 CFR 1926.102
   - WELDER'S HOOD AND GOGGLES, 29 CFR 1926.102
   - EYE PROTECTION FOR WELDER'S HELPERS, 29 CFR 1926.102
   - RESPIRATORS, 29 CFR 1926.103
   - EAR PLUGS OR EAR MUFFS, 29 CFR 1926.101
   - FULL-BODY HARNESSES, LANYARDS, LIFE LINES, ETC., 29 CFR 1926.104, 1926(M)
   - METATARSAL GUARDS FOR JACK HAMMER AND TAMPER OPERATIONS, 29 CFR 1926.28(a)

J. Explosives

1. Will explosives be used on this project? If YES, all work must be performed in accordance with Chapter 24 of the *Health & Safety Manual* and OSHA 29 CFR 1910 and 29 CFR 1926.

2. Will the subcontractor be working in a confined space (including vaults, tanks, or manholes) where combustible, toxic, or other hazardous materials are present or where electrical hazards or an oxygen-deficient atmosphere may exist? If YES, requirements a–d apply.
   a. Perform work in accordance with Supplement 26.14 of the *Health & Safety Manual*.
   b. Use supplied airline masks in confined areas, such as manholes, or for sandblasting or similar activities (29 CFR 1926.28).
   c. Use portable ventilation blower equipment in confined spaces and where combustible vapors or gases are present.
   d. Arrange entry through the Construction Inspector.

2. For sanitation, the following list applies?
   a. An adequate supply of drinking water, cups, and a waste receptacle shall be provided.
   b. Toilets shall be provided in accordance with 29 CFR 1926.51(c).
   c. Washing facilities shall be provided as outlined in 29 CFR 1926.51(f).

3. Will the work performed on this project involve the use of chemicals, such as paints, solvents, adhesives, or other hazardous materials? If YES, answer questions a–i.
   a. Is there a written plan describing your Workers Right-To-Know Policy and the methods for implementation of this plan? (29 CFR 1926.59)
   b. Are all containers of hazardous material properly labeled?
   c. Submit a list of these materials and attach Material Safety Data Sheets (MSDSs).
   d. Are MSDSs provided for all employees using these materials?
   e. Are all employees using these materials trained in safe handling?
   f. Is sufficient ventilation being provided to control airborne concentrations of hazardous materials? If YES, attach a detailed description.
   g. Will respiratory protective equipment be provided for work where hazardous airborne materials are present? If YES, attach a detailed description.
   h. Will adequate skin and eye protection be provided? If YES, attach a detailed description.
   i. Will the contractor be using coal tar products?

4. Will workers be exposed to excessive noise levels (85dBA) for more than 8 hr? If YES, attach a detailed description of noise sources and the hearing protection to be used.

5. Will visible airborne soil and cement dust be generated? If YES, requirements a and b apply.
   a. Will watering be used to control dust?
   b. Will respirators be used to control worker exposures?
6. Will the work performed on this project involve the use of sandblasting equipment? If YES, the subcontractor must provide and use appropriate personnel protective equipment in accordance with 29 CFR 1926.28. Attach a description.
7. Will the subcontractor work with asbestos? If YES, the provisions of 29 CFR 1926.1101, the Asbestos Safety Criteria contract specifications, and Supplement 21.19 of the *Health & Safety Manual* apply.

IV. Fire Protection and Prevention

Will the following be available as needed?

1. Fire extinguishers located in or at—
   a. Construction offices, sheds, etc.
   b. Scene of hot work, torch, welding, soldering.
   c. Roofing operations (at tar pot and on roof).
   d. Flammable liquid and gas storage areas.

NOTE: Items c and d require a fire extinguisher of 20 BC as a minimum.

2. Are No-Smoking signs posted in the following areas?
   a. Flammable liquid and gas storage areas?
   b. Spray-painting operations?
   c. Equipment refueling areas?
3. Are approved metal safety cans provided for all flammable and combustible liquids?
4. Will the subcontractor be welding or using cutting torches? If YES, and indoors, attach a description of the ventilation system.
5. A fire extinguisher rated not less than 2A shall be provided for each 3000 ft^2 [29 CFR 1926.1509(c)(1)].

V. Industrial Hygiene

1. Will radiography be performed or radioactive materials or ionizing radiation sources be used?
2. Will work be performed in areas where access is controlled for radiation purposes?

If YES to either or both questions, the construction inspector or program construction coordinator must be notified immediately before start of the job. Compliance with 29 CFR 1910.1096 and 10 CFR 835 is required.